

CLAIMS

- 1 1. Apparatus for configuration independent simulation of network layer conditions in
2 a simulated network that transmits data packets between a DUT and another
3 component, the apparatus comprising:
4 a network layer verification mechanism connected between the DUT and
5 the other component, the network layer verification mechanism having a storage
6 and a plurality of methods for selectively forwarding data packets between the
7 DUT and the other component or for selectively storing data packets moving
8 between the DUT and the other component; and
9 an API interface for invoking the methods to simulate conditions that can
10 occur in the network, including dropped packets, duplicate packets, corrupted
11 packets, out-of-order packets and delayed packets.
- 1 2. The apparatus of claim 1 wherein the network layer verification mechanism is
2 implemented as a specialized object written in an HVL.
- 1 3. The apparatus of claim 2 wherein the object includes internal storage in the form
2 of an associative array and a plurality of methods that allow packets received by
3 the object to be selectively forwarded through the object, temporarily stored in
4 the object or the packet data to be corrupted.
- 1 4. The apparatus of claim 1 wherein the network layer verification mechanism
2 comprises a packet ingress section and a packet egress section.
- 1 5. The apparatus of claim 4 wherein the API interface includes a method for
2 transmitting packets between the packet ingress section and the packet egress
3 section.

- 1 6. The apparatus of claim 4 wherein the API interface comprises a method for
2 transmitting packets between the packet ingress section and the storage.
- 1 7. The apparatus of claim 4 wherein the API interface comprises a method for
2 transmitting a packet stored in the storage to the packet egress section.
- 1 8. The apparatus of claim 4 wherein the API interface comprises a method for
2 retrieving a packet stored in the storage.
- 1 9. The apparatus of claim 4 wherein the API interface comprises a method for
2 modifying a data packet received at the ingress section.
- 1 10. The apparatus of claim 9 wherein the API interface comprises a method for
2 restoring a modified data packet in the storage.
- 1 11. A method for configuration independent simulation of network layer conditions in
2 a simulated network that transmits data packets between a DUT and another
3 component, the method comprising:
4 (a) creating a network layer verification mechanism having a storage and a
5 plurality of methods for selectively forwarding data packets between the
6 DUT and the other component or for selectively storing data packets
7 moving between the DUT and the other component;
8 (b) connecting the network layer verification mechanism between the DUT
9 and the other component; and
10 (c) invoking the methods with an API interface to simulate conditions that can
11 occur in the network, including dropped packets, duplicate packets,
12 corrupted packets, out-of-order packets and delayed packets.
- 1 12. The method of claim 11 wherein step (a) comprises implementing the network
2 layer verification mechanism as a specialized object written in an HVL.

- 1 13. The method of claim 12 wherein step (a) comprises creating the object with
2 internal storage in the form of an associative array and a plurality of methods that
3 allow packets received by the object to be selectively forwarded through the
4 object, temporarily stored in the object or the packet data to be corrupted.
- 1 14. The method of claim 11 wherein step (a) comprises receiving packets at a packet
2 ingress section of the network layer verification mechanism and transmitting
3 packets from a packet egress section of the network layer verification
4 mechanism.
- 1 15. The method of claim 14 wherein the API interface includes a method for
2 transmitting packets between the packet ingress section and the packet egress
3 section.
- 1 16. The method of claim 14 wherein the API interface comprises a method for
2 transmitting packets between the packet ingress section and the storage.
- 1 17. The method of claim 14 wherein the API interface comprises a method for
2 transmitting a packet stored in the storage to the packet egress section.
- 1 18. The method of claim 14 wherein the API interface comprises a method for
2 retrieving a packet stored in the storage.
- 1 19. The method of claim 14 wherein the API interface comprises a method for
2 modifying a data packet received at the ingress section.
- 1 20. The method of claim 19 wherein the API interface comprises a method for
2 restoring a modified data packet in the storage.

- 1 21. A computer program product for configuration independent simulation of network
2 layer conditions in a simulated network that transmits data packets between a
3 DUT and another component, the computer program product comprising a
4 computer usable medium having computer readable program code thereon,
5 including:
- 6 (a) program code that creates a network layer verification mechanism having
7 a storage and a plurality of methods for selectively forwarding data
8 packets between the DUT and the other component or for selectively
9 storing data packets moving between the DUT and the other component;
- 10 (b) program code that connects the network layer verification mechanism
11 between the DUT and the other component; and
- 12 (c) an API interface that invokes the methods to simulate conditions that can
13 occur in the network, including dropped packets, duplicate packets,
14 corrupted packets, out-of-order packets and delayed packets.
- 1 22. The computer program product of claim 21 wherein the program code that
2 creates a network layer verification mechanism comprises program code that
3 implements the network layer verification mechanism by instantiating a as a
4 specialized object written in an HVL.
- 1 23. The computer program product of claim 22 wherein the program code that
2 creates a network layer verification mechanism comprises program code that
3 instantiates the object with internal storage in the form of an associative array
4 and a plurality of methods that allow packets received by the object to be
5 selectively forwarded through the object, temporarily stored in the object or the
6 packet data to be corrupted.
- 1 24. The computer program product of claim 21 wherein the program code that
2 creates a network layer verification mechanism comprises program code that
3 creates a packet ingress section of the network layer verification mechanism and

4 program code that creates a packet egress section of the network layer
5 verification mechanism.

1 25. The computer program product of claim 24 wherein the API interface includes a
2 method for transmitting packets between the packet ingress section and the
3 packet egress section.

1 26. The computer program product of claim 24 wherein the API interface comprises
2 a method for transmitting packets between the packet ingress section and the
3 storage.

1 27. The computer program product of claim 24 wherein the API interface comprises
2 a method for transmitting a packet stored in the storage to the packet egress
3 section.

1 28. The computer program product of claim 24 wherein the API interface comprises
2 a method for retrieving a packet stored in the storage.

1 29. The computer program product of claim 24 wherein the API interface comprises
2 a method for modifying a data packet received at the ingress section.

1 30. The computer program product of claim 29 wherein the API interface comprises
2 a method for restoring a modified data packet in the storage.

1 31. A computer data signal embodied in a carrier wave for configuration independent
2 simulation of network layer conditions in a simulated network that transmits data
3 packets between a DUT and another component, the computer data signal
4 comprising:

- 5 (a) program code that creates a network layer verification mechanism having
6 a storage and a plurality of methods for selectively forwarding data

- 7 packets between the DUT and the other component or for selectively
8 storing data packets moving between the DUT and the other component;
- 9 (b) program code that connects the network layer verification mechanism
10 between the DUT and the other component; and
- 11 (c) an API interface that invokes the methods to simulate conditions that can
12 occur in the network, including dropped packets, duplicate packets,
13 corrupted packets, out-of-order packets and delayed packets.